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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,245	08/22/2006	Jun Takada	20166	6746

23389 7590 06/08/2010

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EXAMINER	
LIU, LI	

ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
06/08/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/590,245	TAKADA, JUN	
	Examiner	Art Unit	
	LI LIU	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 April 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,22-25,38-41,46-54,74,75,84 and 85* is/are pending in the application.

4a) Of the above claim(s) *22-25,38-41 and 46-49* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,50-54,74,75,84 and 85* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/03/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment received on 04/14/2010 has been entered and made of record.

Claims 1-8, 22-25, 38-41,46-54,74,75,84 and 85 are pending. Claims 22-25, 38-41 and 46-49 are withdrawn from further consideration by the Examiner.

Claims 1-8, 50-54, 74, 75, 84, and 85 are being examined.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 06/03/2010 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information referred to therein has been considered by the examiner.

Response to Arguments/Remarks

3. Applicant's arguments filed on 04/14/2010 with respect to claim 1, 50, 74, 84, and 85 have been considered but are moot in view of the new ground(s) of rejection herein below, necessitated by the amendment. To the extent that the current arguments apply, each will be addressed below.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "every time a set of LH, HL and HH subband coefficients are decoded, those coefficients are immediately subjected to an inverse wavelet transfer operation on a register, allowing the reduction in the amount of accessed real memory") are not recited

in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues on page 17 of the remarks that "a predetermined number" recited in Applicant's claims refers to literally primitive signals (pixels), not the number of hierarchies of subbands. However, the limitation as recited in line 4 of claim 1 "a predetermined number of the two-dimensional signals" fails to particularly point out that the two-dimensional signals refer to primitive "pixels". There is insufficient antecedent basis for the limitation "the two-dimensional signals" because there is only ONE "two-dimensional signal" defined before in line 2. In addition, a two-dimensional signal usually refers to an image comprising multiple pixels. In the context of the claims, a person with ordinary skills in the art normally would not regard a single image pixel as a two-dimensional signal.

Applicant further argues that the rejection falsely interprets "a predetermined number of coefficients" as the number of hierarchies (the number "n"). The Examiner respectively disagrees. As clearly stated in the previous Office Action, the number "n" in Figs. 21A, 21B is interpreted by the Examiner as corresponding to the claimed "number" of two-dimensional signals, while the coefficients at each decompose level correspond to the claimed "predetermined number of coefficients". Given the predetermined size of input image and the number "n", the number of coefficients is clearly predetermined too.

4. Applicant's arguments with respect to claims 4 and 75 have been fully considered but they are not persuasive.

Applicant argues that Sirohey (US 2002/0057844) used "S-transform", not "Haar wavelet transform" as recited in the instant application. Applicant states that the S-transform is "distinctively different" from a Haar wavelet transform. To support this argument, Applicant cited Calderbank's paper "Lossless image compression using integer to integer wavelet transforms".

The Examiner respectfully disagrees. As stated both in the Sirohey reference (**pg. [0077]-[0078]**) and the Calderbank paper (**page 596, at bottom of left column**), the S-transform is an integer version of the Haar transform. The previous Office Action, citing Sirohey, also expressly pointed out (page 5, rejection of claim 4) that the S-Transform is Haar wavelet with lifting. Therefore, the Examiner respectfully insists that Sirohey, using the S-Transform, reads on the limitation of using Haar wavelet transform in claim 4 or claim 75, hence the standing rejections of claims 4 and 75 under 35 U.S.C. 102 are proper.

Claim Objections

5. Claims 1, 74, and 84 are objected to because of the following informalities:

Claim 1 recites "**a predetermined number of the two-dimensional signals into a predetermined number of coefficients**" in line 4. However, in line 7, claim 1 recites "**a predetermined number of two-dimensional signals into a predetermined number of coefficients**". Although it appears as though they refer to the same "predetermined number of the two-dimensional signals" and "predetermined number of

coefficients", Applicant is advised to clarify this by using consistent nomenclature (for example, use "the predetermined ... into the predetermined ..." in line 7).

A similar objection applies to claims 74 and 85.

Claim Rejections - 35 USC § 112, second paragraph

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-3, 5, 7, 74, and 85 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "**a predetermined number of the two-dimensional signals**" in line 4. There is insufficient antecedent basis for the limitation "the two-dimensional signals" because there is only ONE "two-dimensional signal" defined before in line 2.

A similar rejection applies to claims 74 and 85.

Claims not mentioned specifically are dependent from indefinite antecedent claims.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-4, 50-52, 74, 75, 84, and 85 are rejected under 35 U.S.C. 102(b) as being anticipated by Sirohey et al. (hereafter referred to as 'Sirohey', US 2002/0057844).

Regarding claim 1, Sirohey discloses an encoding device comprising:

two-dimensional Haar wavelet transforming means (**pg. [0077], [0078], Haar wavelet with lifting**) for dividing a two-dimensional signal (**Fig. 15, image data 330**) into subbands as a plurality of frequency regions (**LL, HL, LH, HH**) in a predetermined signal scanning sequence (**Fig. 21A, block 446, the scanning sequence is determined by (X Y): (1, 3, 3) -> (1, 3, 2) -> (1, 3, 1)**) to transform a predetermined number (**the number "n" in Figs. 21A, 21B, numeral 538 in up-right corner of Fig. 21B is for decompose LL(n-1)**) of two-dimensional signals (**numerals 418, 462, ... for each decompose level in Figs. 21A, 21B**) into a predetermined number of coefficients (**the number of coefficients at each decomposition level is predetermined by size of the input image and the number n**);

coefficient extracting means for, whenever said two-dimensional Haar wavelet transforming means transforms a predetermined number (**the number "n" in Figs. 21A and 21B**) of two-dimensional signals (**numerals 418, 462, ... for each decompose level**) into a predetermined number of coefficients in the course of the transform process (**coefficients of LL, HL, LH, and HH sub-bands at each decompose level**), extracting sets of AC-component coefficients from the coefficients obtained by the transform (**HL, LH, and HH**), for every predetermined number of sets of coefficients

which belong to a same hierarchy **(see block 432 in Fig. 21A, sub-bands 424, 426 and 428 belong to the same hierarchy)** and a same spatial position (**Figs. 21A-B, 22A-B, and pg. [0109]-[0110], the tessellated high frequency sub-bands 424, 426 and 428 are identified by HL(n, X, Y), LH(n, X, Y), HH(n, X, Y), while the low frequency sub-band LL(n, X, Y) is passed for further wavelet decomposition. n denotes the decompose level: 1, 2, ...**);

coefficient encoding means for encoding and concatenating the thus encoded coefficient sets in a sequence the coefficients sets were extracted in the same hierarchy to generate a code sequence of a high-frequency subband (**Figs. 21A-B and pg. [0109]-[0110], numerals 446, 490, 532 show code sequence of concatenated AC component coefficient sets for levels 1, 2, 3, respectively**);

initial coefficient encoding means for encoding and concatenating a DC component as a lowest-frequency subband (**LL(n)**) to generate a code sequence of the lowest-frequency subband (**Figs. 21A-B and pg. [0109], numeral 562 in bottom-right of Fig. 21B is the lowest-frequency subband LL(n)**); and

code output means for outputting the code sequence of the lowest-frequency subband, and sequentially outputting the code sequence of the high-frequency subband generated by said coefficient encoding means (**Figs. 21A-B and pg. [0109]-[0110], data stream 404 comprises code sequence of the lowest-frequency subband LL(n), followed by HL(n), LH(n), HH(n), ... HL(1), LH(1), HH(1)**).

Regarding claim 2, Sirohey discloses an encoding device according to claim 1, wherein said predetermined signal scanning sequence represents a sequential order of scan lines of the two-dimensional signal, and said coefficient extracting means sequentially extracts a predetermined number of coefficient sets at a time in a scan line direction of the two-dimensional signal (**Fig. 21A and pg. [0109], the process 400 stores each spatially equivalent set of high-frequency sub-band blocks, resulting in the 16 data blocks 446 in a scan line direction (X, Y) = (0, 0) → (0, 1) → (0, 2) → (0, 3) → (1, 0) → ....**).

Regarding claim 3, Sirohey discloses an encoding device according to claim 1, characterized in that said coefficient extracting means sequentially extracts coefficient sets one by one (**Figs. 21A-B and pg. [0109]-[0110], e.g., numeral 446 indicates that spatially equivalent coefficient sets in decompose level 1 is extracted one by one following the order of (X, Y) = (0, 0) → (0, 1) → (0, 2) → (0, 3) → (1, 0) → ....**).

Regarding claim 4, Sirohey discloses an encoding device characterized by comprising:

element extracting means for sequentially extracting 2m x 2 (m is an integer: $m \geq 1$) spatially adjacent elements from a two-dimensional signal (**pg. [0078]-[0081], the S-Transform is used to decomposition of the image data**);

two-dimensional Haar wavelet transforming means for dividing the 2m x 2 elements into a plurality of subband coefficient sets (**pg. [0078]-[0081], the S-Transform is Haar wavelet with lifting**);

coefficient encoding means for encoding and concatenating the AC-component coefficient sets obtained by transform by said two-dimensional Haar wavelet transforming means, and generating a code sequence of a high-frequency subband (**Figs. 21A-B, 22A-B, and pg. [0109]-[0110], the tessellated high frequency sub-bands 424, 426 and 428 are identified by HL(n, X, Y), LH(n, X, Y), HH(n, X, Y), while the low frequency sub-band LL(n, X, Y) is passed for further wavelet decomposition. n denotes the decompose level: 1, 2, ...**);

initial coefficient encoding means for encoding and concatenating a DC component as a lowest-frequency subband (**LL(n)**), and generating the code sequence of the lowest-frequency subband (**Figs. 21A-B and pg. [0109], numeral 562 in Fig. 21B is the lowest-frequency subband LL(n)**); and

code output means for outputting the code sequence of the lowest-frequency subband, and sequentially outputting the code sequence of the high-frequency subband generated by said coefficient encoding means (**Figs. 21A-B and pg. [0109]-[0110], data stream 404 comprises code sequence of the lowest-frequency subband LL(n), followed by HL(n), LH(n), HH(n), ... HL(1), LH(1), HH(1)**).

Regarding device claims 50-52, they are the corresponding decoding device of claims 1-3. Sirohey discloses the decoding device that reverse the encoding procedure to get the original image (**Figs. 24A-B**).

Regarding encoding program claims 74 and 75, the limitations of the claim are rejected for the same reasons as set forth in the rejection of claims 1 and 4 above, respectively.

Regarding decoding program claim 84, which is the corresponding decoding program of claim 50. The limitations of the claim are rejected for the same reasons as set forth in the rejection of claim 50 above.

Regarding claim 85, which combines the limitations of the encoding device of claim 1 with the limitations of decoding device of claim 50, and is therefore rejected for the same reasons as set forth in the rejection of claims 1 and 50 above. Sirohey discloses displaying a received image on the basis of the received image signal (Sirohey, Fig. 25).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 5-8, 53, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sirohey (US 2002/0057844) as applied to claims 1 and 4 above respectively, and further in view of Okada et al. (hereafter referred to as 'Okada', US 7120306).

Regarding claims 5 and 6, Sirohey discloses an encoding device according to claims 1 and 4, respectively, but fails to disclose that each coefficient comprises a plurality of components, which is interpreted as color components such as RGB, YUV, etc.

Okada, in the same field of endeavor, discloses an image coding method wherein each coefficient comprises a plurality of components (**Okada, Fig. 3, components Y, C_b, and C_r**), and code is generated by concatenating a code of each component (**Okada, Fig. 3, composition of the data stream**).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Okada with that of Sirohey to yield the invention as described in claims 5 and 6, so that Sirohey's device can be used to code images with multiple components such as RGB or YUV. One of ordinary skill in the art would have recognized that the results of the combination were predictable and the combination enables desired regions of a color image individually handled for storage, transmission, retrieval, and display (Sirohey, abstract).

Regarding claims 7 and 8, Sirohey discloses an encoding device according to claims 1 and 4, respectively, but fails to disclose that each coefficient comprises a plurality of components, which is interpreted as color components such as RGB, YUV, etc.

Okada, in the same field of endeavor, discloses an image coding method wherein each coefficient comprises a plurality of components (**Okada, Fig. 3, components Y, C_b, and C_r**), and code is generated by concatenating a code of each coefficient (**Okada, Fig. 3, quantization and coding of coefficients of each component**).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Okada with that of Sirohey to yield the invention as described in claims 7 and 8, so that Sirohey's device can be used to code images with multiple components such as RGB or YUV. One of ordinary skill in the art would have recognized that the results of the combination were predictable and the combination enables desired regions of a color image individually handled for storage, transmission, retrieval, and display (Sirohey, abstract).

Regarding device claims 53 and 54, it is the corresponding decoding device of claim 5. It would have been obvious to one having ordinary skill in the art at the time the invention was made to reverse the encoding procedure to get the original image. A mere reversal of the coding process is held involving only routine skill in the art.

Conclusion

12. **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Calderbank et al. "Lossless image compression using integer to integer wavelet transforms", IEEE Proceedings of International Conference on Image Processing, 1997, Page(s): 596 - 599 vol.1

Porwik et al. "The Haar-Wavelet Transform in Digital Image Processing: its status and achievements", Machine Graphics & vision, vol. 13, 2004, pp. 79-98.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-5363. The examiner can normally be reached on Monday-Thursday, 7:00AM-4:30PM, ALT. Fridays, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed, can be reached on (571)272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

L.L.

/Samir A. Ahmed/

Supervisory Patent Examiner, Art Unit 2624